CLIMATE CHANGE QUESTIONNAIRE

1. **Projections and Planning Targets**. What guidance (e.g., Ocean Protection Council guidance), projections, and assumptions is your agency using to anticipate the effects of climate change? Is your agency using a specific sea level rise projection for facility planning? If so, what specific increment of sea level rise or flood elevation is your agency planning for, what is the associated time frame (e.g., 3.5 feet by 2050), and what site-specific information did your agency include in this analysis (e.g., 100 year flood recurrence interval), if known?

Response

2. **Vulnerability Assessment**. Assess the vulnerability of your agency's collection, treatment, and discharge systems to the following: (1) sea level rise, (2) groundwater rise, (3) changing climate and weather, and (4) power outages and wildfires.

    a. ***Sea Level Rise***. If your agency's facilities are currently within the FEMA 100-year flood plain and not protected by a FEMA-accredited levee, explain how your agency manages its <u>existing</u> flood risks (e.g., protective measures already in place, planned, or proposed). We understand that the treatment plants listed in Table 1 (marked green and yellow on Figures 4 and 5 of the *Nutrient Reduction Study*) are probably not susceptible to existing flood risks; in these cases, your response may be particularly brief and may be limited to collection and discharge systems. If your agency's treatment plant is not listed in Table 1 but is also protected by a FEMA-accredited levee or not within the FEMA 100-year flood plain, simply explain the basis for this conclusion.

Response

If your agency's facilities are currently within the FEMA 100-year flood plain and not protected by a FEMA-accredited levee <u>or</u> if your facilities are projected to be affected by sea level rise within 50 years, explain how your agency intends to

manage future flood risks over a 50-year time horizon (e.g., ongoing planning efforts and protective measures already in place, planned, or proposed). If your agency has not yet established a plan, explain its process and timeline for doing so in your response to item 3c, below. We understand that, with the exception of South San Francisco and San Bruno, the treatment plants listed in Table 1 are probably not susceptible to flooding related to sea level rise within 50 years. In these cases, responses may be limited to collection and discharge systems. If your agency's treatment plant is not listed in Table 1 but you believe it meets the same criteria, simply explain the basis for this conclusion.

Response

b. ***Groundwater Rise***. Groundwater rise is becoming an issue of concern. For more information, see publications from the San Francisco Estuary Institute (*Shallow Groundwater Response to Sea Level Rise*), Hummel et al. (*Sea Level Rise Impacts on Wastewater Treatment Systems Along the US Coasts*), and Plane et al. (A Rapid Assessment Method to Identify Potential Groundwater Flooding Hotspots as Sea Levels Rise in Coastal Cities).[1] If your agency's facilities are susceptible to flooding related to groundwater rise or if its facilities are projected to be affected by groundwater rise within 50 years, explain how it intends to manage future flood risks over a 50-year time horizon (e.g., ongoing planning efforts and protective measures already in place, planned, or proposed). If your agency has not yet established a plan, explain its process and timeline for doing so in your response to item 3c, below.

Response

c. ***Changing Climate and Weather***. Assess how increased temperatures, greater rainfall intensity, and longer and drier summers may affect your agency's collection, treatment, and discharge systems. For example, under drought conditions, wastewater treatment plants are expected to face numerous challenges related to conveying and treating wastewater, as described in

[1] https://www.sfei.org/projects/shallow-groundwater-response-sea-level-rise; https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017EF000805 (Hummel, M., M. Berry, and M. Stacey. 2018. Sea Level Rise Impacts on Wastewater Treatment Systems Along the US Coasts. Earth's Future 6 (4): 622–633); https://www.mdpi.com/2073-4441/11/11/2228/htm (Plane, E., K. Hill, and C. May. 2019. A Rapid Assessment Method to Identify Potential Groundwater Flooding Hotspots as Sea Levels Rise in Coastal Cities. Water 11, 2228).

Adapting to Change: Utility Systems and Declining Flows.[2] Explain how your agency intends to manage future risks. If your agency has not yet established a plan, explain its process and timeline for doing so in your response to items 3b and 3c, below.

Response

d. ***Power Outages and Wildfires***. Assess how increasing stress on the power grid from more extreme heat waves and related power shutoffs, or from power shutoffs to your agency's service area to prevent wildfires, may affect critical equipment and any need for additional back-up power. Explain how your agency intends to manage future risks. If your agency has not yet established a plan, explain its process and timeline for doing so in your response to items 3b and 3c, below.

Response

3. Adaptation Strategies. Based on the vulnerabilities of your agency's collection, treatment, and discharge systems, identify mitigation and control measures needed to maintain, protect, and improve its wastewater infrastructure under existing and possible future conditions.

a. ***Regional and Sub-regional Collaboration***. Explain how your agency plans to work directly with regional stakeholders (e.g., Caltrans, PG&E, flood control agencies, etc.) and neighboring communities to address climate change impacts in its area. A collaborative approach may best provide cost-effective ways to manage sea level rise and groundwater rise, while ensuring that the actions of one party do not adversely affect the adaptation plans of other parties. For

[2] California Urban Water Agencies. 2017. *Adapting to Change: Utility Systems and Declining Flows.* https://www.cuwa.org/pubs/2018/1/10/uhjemzug04iar61oijljp8ovn67zqb

example, we strongly encourage collaboration within Operational Landscape Units identified in the *San Francisco Bay Shoreline Adaptation Atlas*.[3]

Response

b. ***Near-Term Measures***. Identify any critical mitigation and control measures necessary within the near-term (e.g., within the next 5 to 10 years). Does your agency's capital improvement plan account for these measures? If not, how does your agency intend to pursue them?

Response

c. ***Long-Term Design Modifications and Improvements***. Explain how infrastructure identified as vulnerable to climate change impacts will need to be modified in the future. For example, it may be necessary to relocate critical equipment above projected flood levels, waterproof facilities at risk of flooding, or construct levees or seawalls. As sea level rises, increasing pumping capacity may also be necessary to ensure your agency can discharge treated wastewater under an increased hydraulic pressure head. If planning is still underway, what options are under consideration?

Response

[3] https://www.sfei.org/adaptationatlas

d. ***Monitoring.*** Climate change may trigger new monitoring needs for your agency's collection, treatment, and discharge systems. For example, increased residence times in the collection system could cause corrosion if wastewater turns septic, and increased salinity levels could impair your ability to beneficially reuse treated wastewater. Has your agency already installed or planned new monitoring (e.g., salinity, conductivity, or hydrogen sulfide monitoring) at its treatment plant or collection system to respond to potential climate change-related impacts? What new monitoring does your agency anticipate needing to implement in the future?

Response

e. ***Emergency Response Planning.*** Has your agency updated its contingency plan, emergency response plan, or hazard mitigation plan to incorporate flood risks associated with sea level rise and groundwater rise? If so, briefly describe the updates.

Response

f. ***Financing***. Has your agency estimated the cost of mitigation and control measures necessary to respond to climate change? If so, describe your agency's efforts to finance these improvements, including rate increases, grants, and loans.

Response

TABLE 1

Facilities Protected by FEMA-accredited Levee or
Not within FEMA 100-year Flood Plain

American Canyon	Novato Sanitary District
Delta Diablo	Petaluma
Dublin-San Ramon Services District	Richmond Municipal Sewer District
East Bay Municipal Utility District	San Francisco (Southeast Plant)
Fairfield Suisun Sewer District	San Mateo
Hayward	Sewerage Agency of Southern Marin
Las Gallinas Valley Sanitary District	Silicon Valley Clean Water
Livermore	Sonoma Valley County Sanitary District
Mt. View Sanitary District	South San Francisco and San Bruno

Note: This list is based on existing Water Board records but is incomplete. If your agency should be listed here, please explain in response to Question 1a and cite documentation.

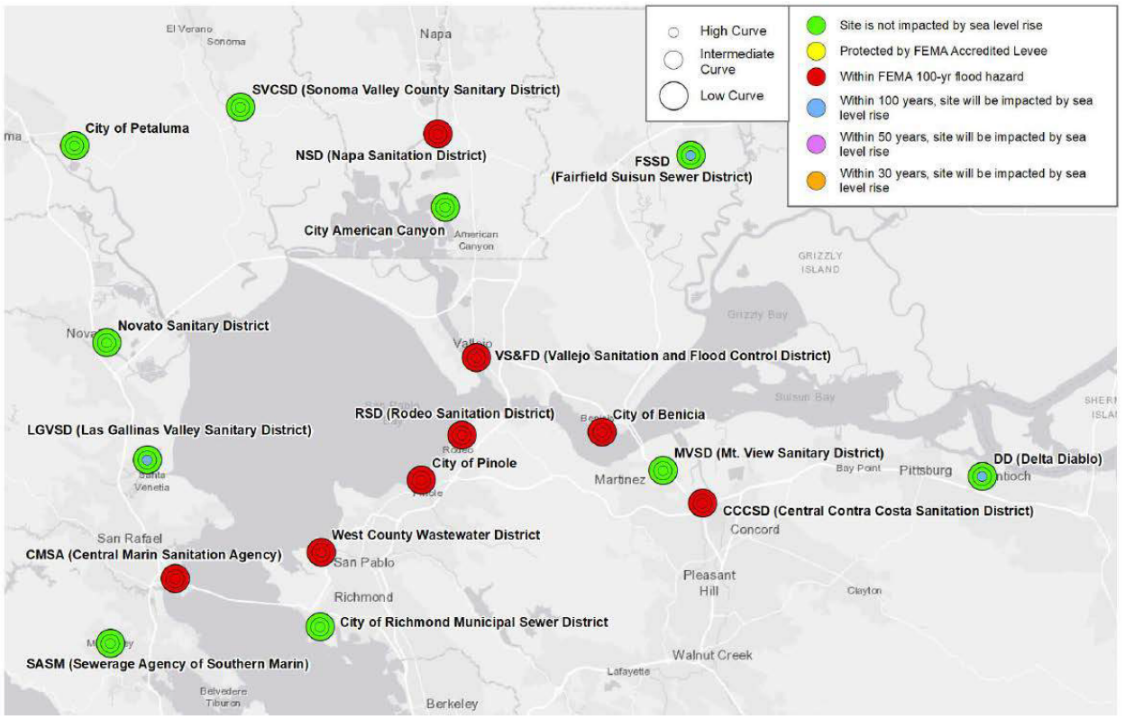

Figure 4 – Sea Level Rise Evaluation Results, North Bay

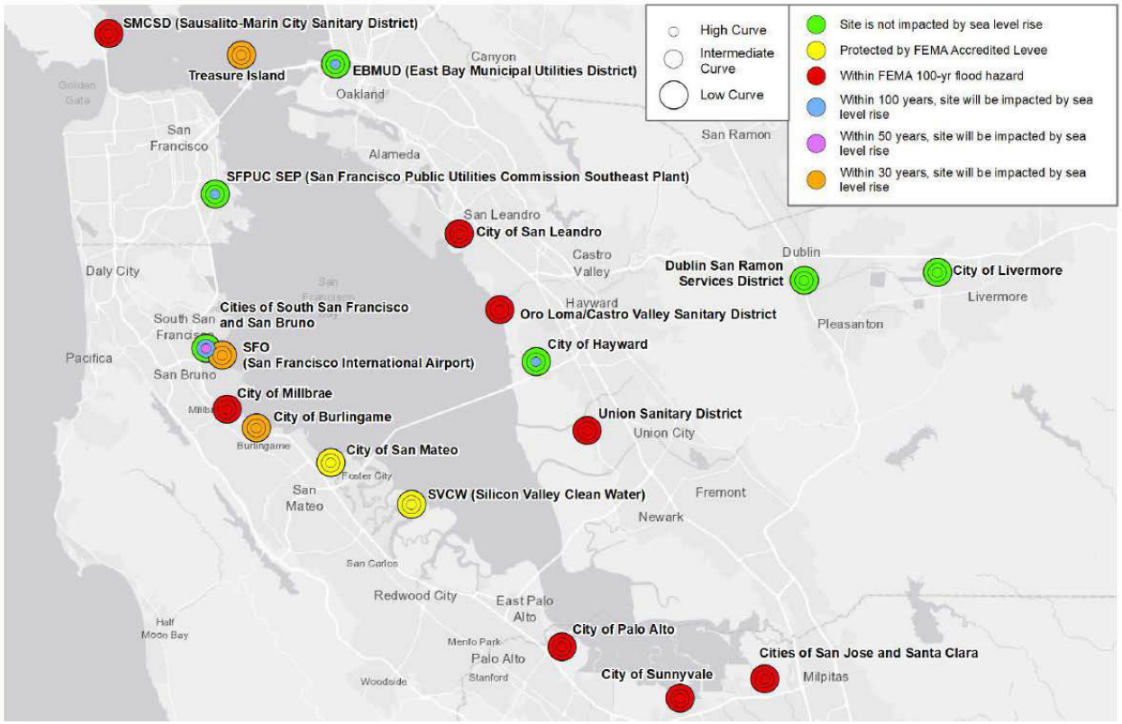

Figure 5 – Sea Level Rise Evaluation Results, South Bay